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EXAMINER	
HARRIS, GARY D	

ART UNIT	PAPER NUMBER
1785	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/541,096	CHOI ET AL.	
	Examiner	Art Unit	
	GARY D. HARRIS	1785	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 March 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12,17 and 19-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12,17 and 19-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-12, 17 and 19-25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicant's amendment to a "granular ferromagnetic metal particle" is not found in the specification or figures that would allow one skilled in the art to recognize that the ferromagnetic material is a granular ferromagnetic material. A granular ferromagnetic material is a ferromagnetic particle with an oxide. Applicant's specification calls for ferromagnetic particles in a matrix of a nonmagnetic insulating film. This is clearly different from a granular ferromagnetic particle in an insulating film.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-12, 17, 19, 20, 22, 24 & 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshi et al. JP 02-201904 in view of Fugimori JP 10-189322 A.

As to Claim 1, Takeshi et al. JP 02-201904 discloses a granular substance (ferromagnetic particles) and a nonmagnetic insulating organic material (polymer). The ferromagnetic metal particles are dispersed in said nonmagnetic insulating organic material where a deposition of the polymer occurs between the ferromagnetic particles.

JP '904 does not disclose the particle size however, the resistivity shown is 180 micro-ohm-cm or more (similar to instant invention, abstract).

JP 10-189322 discloses a soft magnetic granular substance in a nonmagnetic insulating material (Paragraph 0004) having a mean particle size of 10 nm or less (Paragraph 0012) in creating a film with high specific resistance and simultaneously reducing the eddy current loss.

It would have been obvious to select ferromagnetic particles from 5 to 15 nm in creating a film with high specific resistance while simultaneously reducing the eddy current loss.

Additionally, JP '322 discloses a surface ratio of not larger than 15 percent (table 1, line 11 and 14).

The surface area ratio is: $(4*pi*r^2)_a/(4*pi*r^2)_b$ is <15% which would be reduced to $r^2{}_a/r^2{}_b <$ 15% (JP '322)

Applicant claim is for volume ratio which would be reduced to $r^3{}_a/r^3{}_b <$ 5 to 50% (applicant)

Given that both JP' 322 and applicant considered ratios. One looking at the above relationships would realize that they both obtain a ratio of the radius of a ferromagnetic particle and oxide layer.

JP '322 is using a Fe and Co soft magnetic material (Paragraph 0005, 0006 & 007) surrounded by an insulating matrix (Fe-M-O, Co-M-O) where M is an element easily combined with oxygen (Paragraph 0007). Where the "M" is disclosed as being Si or Al in the case of Co-M-O. The ratio is considered a result effective variable as the volume ratio (and/or the area ratio) would be changed by the diffusion of oxygen (Paragraph 0031) in determining the desired resistivity. That is, as the oxygen increases the resistivity will increase.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the volume ratio to change the resistivity of the film. In the present invention one would have been motivated to optimize the volume ratio of the insulating organic material in the granular material in the range of 5 to 50% in order to change the films resistivity. It has been held that where general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

As to Claim 2 & 3 Takeshi et al. JP 02-201904 discloses the granular substance is ferromagnetic and soft magnetic particles (Fe, Co, Ni) (abstract).

JP ‘932 discloses a NiFe alloy (Paragraph 0002) and ferromagnetic elements including Fe and Co combined with oxygen to create a granular substance (Paragraph 0007) in obtaining high specific resistance. It would have been obvious to utilize ferromagnetic particles of Fe and Co in order to obtain high specific resistance.

As to Claim 4, Takeshi et al. JP 02-201904 discloses the granular substance is ferromagnetic and soft magnetic particles (Fe, Co, Ni) but does not disclose atomic percentages (abstract).

JP ‘932 discloses soft magnetic particles made from Fe and cobalt (Paragraph 0017) and substituting cobalt into the Fe phase (Paragraph 0020). The Fe phaseFe3O4

which would be 72 at% (given atomic mass of Fe=55.845 and O=15.994) ZnFe2O4 and MgFe2O4 (Paragraph 0022). However, JP '932 teaches adding a nonmagnetic metal which does not oxidize as easy at a rate below 20 atomic percent (Paragraph 0015 & 0023). JP'932 discloses manipulating the atomic percentage of Fe and Co in avoiding oxidation. It would have been obvious to one skilled in the art to control the range of Fe and Co from 10 to 50 atomic percentage in order to avoid oxidation.

As to Claim 5, Takeshi et al. JP 02-201904 discloses the granular substance is ferromagnetic and soft magnetic particles (Fe, Co, Ni) and polymer between the particles (spaced apart a distance) that would be capable of exchange coupling (abstract).

As to Claim 6, Takeshi et al. JP 02-201904 discloses the granular substance is ferromagnetic and soft magnetic particles (Fe, Co, Ni) and a polymer (nonmagnetic insulating organic material) between the particles (spaced apart a distance) (abstract).

As to Claim 7, Takeshi et al. JP 02-201904 discloses the granular substance is ferromagnetic and soft magnetic particles (Fe, Co, Ni) and polymer between the particles (abstract) but does not disclose the volume ratio.

JP 10-189322 discloses a soft magnetic granular substance in a nonmagnetic insulating material (Paragraph 0004) having a mean particle size similar to those

claimed (Paragraph 0012) in creating a film with high specific resistance and simultaneously reducing the eddy current loss. JP '322 discloses a surface ratio of not larger than 15 percent (table 1. line 11 and 14). Given that the ferromagnetic particle size is similar (5 to 15nm) the volume ratio would necessarily be similar. The ratio is considered a result effective variable as the volume ratio would be changed in determining the desired resistivity. As the volume ratio increases, the material resistivity will change. Absent unexpected results, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the volume ratio since it has been held that where general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In the present invention one would have been motivated to optimize the volume ratio of the insulating organic material in the granular material in the range of 5 to 40% in order to change the films resistivity.

As to Claim 8, 9, 10 & 22, Takeshi et al. JP 02-201904 discloses the granular substance has a saturation magnetization of 800G or more (see abstract).

JP 10-189322 discloses a soft magnetic granular substance in a nonmagnetic insulating material (Paragraph 0004) having a mean particle size similar to applicant (Paragraph 0012) and a high saturation magnetization flux density beyond 1.3T (greater than 6kG) in obtaining high specific resistance (Paragraph 0017). The complex permeability at 1 GHz, or the quality factor Q of 1 or more is not disclosed.

Both Takeshi ‘904 and JP ‘322 are using a Fe and Co soft magnetic material (Paragraph 0005, 0006 & 007) surrounded by an insulating matrix (Fe-M-O, Co-M-O). Where M is an element easily combined with oxygen (Paragraph 0007). The "M” is disclosed as being Si or Al in the case of Co-M-O. Given that the materials and size are similar they would inherently have similar complex permeability and quality factor Q as claimed. The claiming of a new use, new function or unknown property which is inherently present in the prior art does not necessarily make the claim patentable. There is no requirement that a person of ordinary skill in the art would have recognized the inherent disclosure at the time of invention, but only that the subject matter is in fact inherent in the prior art reference.

As to Claim 11, Takeshi et al. JP 02-201904 discloses the granular substance has a saturation magnetization of 800G or more (see abstract).

JP 10-189322 discloses a soft magnetic granular substance in a nonmagnetic insulating material (Paragraph 0004) having a mean particle size similar to applicant (Paragraph 0012) and a high saturation magnetization flux density beyond 1.3T (greater than 6kG) in obtaining high specific resistance (Paragraph 0017) while having a low permeability (table 2).

It would have been obvious to require the granular substance to have greater than 6 kG or more in order to obtain a high specific resistance while maintaining a low permeability (mu).

As to Claim 12, Takeshi et al. JP 02-201904 discloses the granular substance is ferromagnetic and soft magnetic particles having 180 micro-ohm-cm or more (abstract).

As to Claim 17, Takeshi et al. JP 02-201904 discloses a granular substance (ferromagnetic particles) and a nonmagnetic insulating organic material (polymer). The ferromagnetic metal particles are dispersed in said nonmagnetic insulating organic material where a deposition of the polymer occurs between the ferromagnetic particles. JP '904 does not disclose the particle size however, the resistivity shown is 180 micro-ohm-cm or more (similar to applicant) (abstract).

JP 10-189322 discloses a soft magnetic granular substance in a nonmagnetic insulating material (Paragraph 0004) having a mean particle size of 10 nm or less (Paragraph 0012) in creating a film with high specific resistance and simultaneously reducing the eddy current loss. It would have been obvious to select ferromagnetic particles from 5 to 15nm in creating a film with high specific resistance while simultaneously reducing the eddy current loss.

Additionally, JP ‘322 discloses a surface ratio of not larger than 15 percent (table 1. line 11 and 14). Given that the ferromagnetic particle size is similar (5 to 15nm) the volume ratio would be similar. The ratio is considered a result effective variable as the volume ratio (and/or the area ratio) would be changed by the diffusion of oxygen (Paragraph 0031) in determining the desired resistivity. That is, as the oxygen increases the resistivity will increase. It should be noted that volume ratio is a result effective variables. As the volume ratio increases, the material resistivity will change. Absent unexpected results, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the volume ratio since it has been held that where general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In the present invention, one would have been motivated to optimize the volume ratio of the insulating organic material in the granular material in the range of 5 to 50% in order to change the films resistivity.

As to Claim 19, Takeshi et al. JP 02-201904 discloses the granular substance is ferromagnetic and soft magnetic particles (Fe, Co, Ni) (abstract). JP ‘932 discloses a NiFe alloy (Paragraph 0002) and ferromagnetic elements including Fe and Co combined with oxygen to create a granular substance (Paragraph 0007) in obtaining high specific resistance.

As to Claim 20, Takeshi et al. JP 02-201904 discloses the granular substance is ferromagnetic and soft magnetic particles (Fe, Co, Ni) and a polymer (nonmagnetic insulating organic material) between the particles (spaced apart a distance) (abstract).

As to Claim 24, Takeshi is silent with regard to the magnetic device thin film having a thickness of 100 to 2000 nm.

Fujimori discloses the thickness in a range set to about 100nm but could be as high as 1micron (1000 nm) (Paragraph 0042). As the thickness increases the resistance increases and provides a magnetic field of 250 Oe. The thickness allows for Rutherford backscattering analysis and analysis of magnetic properties (Paragraph 0043-0048).

It would have been obvious to one skilled in the art to change the thickness in a range from 100nm to 1000 nm in order to vary the resistance of the thin film. One would have been motivated to change the thickness in order to allow the thin film to be analyzed using backscattering techniques and to determine the films magnetic properties.

As to Claim 25, Takeshi is silent to a magnetic device characterized in said magnetic device is an inductor which has an insulating film formed on the magnetic thin film and a coil formed on said insulating film.

However Fujimori discloses a thin film inductor (Paragraph 0001), magnetic devices and noise filters as the soft magnetic material is ideal for response to frequencies in MHz range (Paragraph 0002). The soft magnetic film with granular structure includes a nonmagnetic oxide phase which is carried out to phase separation (which would produce an insulating film) (Paragraph 0009). As the insulating film is increased the saturation magnetic flux density decreases.

It would have been obvious to one skilled in the art to produce a magnetic inductor with an insulating film as taught in Fujimori in order to provide a frequency response in the MHz range. One would have been motivated to use the insulating film as this would further control the saturation magnetic flux density.

Although the coil is not disclosed it is considered an obvious modification of the apparatus. One of ordinary skill in the art would have recognized inductors used in monolithic microwave integrated circuits (MMIC's), having planar spiral coils are often used (as disclosed by applicant in specification).

Claim 21 & 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshi et al. JP 02-201904 in view of Fugimori JP 10-189322 A and further in view of . Gay et al. US 5,629,092.

As to Claim 6 & 21, Takeshi et al. JP 02-201904 discloses the granular substance is ferromagnetic and soft magnetic particles having 180 micro-ohm-cm or more (abstract) but does not disclose the polymer.

However, Gay et al. US 5,629,092 discloses soft ferromagnetic particles coated with Teflon (applicants fluoropolymer) in obtaining high lubricity (Col. 5, Line 62-67, 1-45 respectively). Teflon also has the advantage of not bound to the surface of the iron particles by a polymeric binder (Col. 13, Line 23-38).

It would have been obvious to select a fluoropolymer for the polymer in Takeshi et al. '904 in order to obtain high lubricity. One skilled in the art would have been motivated to use the fluoropolymer in Gay in the Takeshi invention in order to allow the iron particles not to be bound at the surface by a polymeric binder. One of ordinary skill would recognize using a fluoropolymer would enhance exchange coupling interaction in a granular substance.

Response to Arguments

Applicant's arguments (*in italics*) filed on 03/11/2010 are addressed as follows:

Claims 1-12, 17, 19-20, and 22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshi, et al. (JP 02-201904) in view of Fujimori (JP 10-189322 A). Applicant respectfully traverses this rejection.

Claims 1 and 17, have been amended to indicate that the ferromagnetic particles are granular. Applicant respectfully submits that Takeshi fails to disclose or teach at least, the following as set forth by the claims: (A) granular ferromagnetic metal particles; (B) granular ferromagnetic metal particles having a mean particle size of 5 to 15 nm; and (C) a nonmagnetic insulating organic material in the granular substance that is in the range of 5 to 50 vol%.

In contrast, Takeshi discloses that:

"Simultaneous vacuum deposition makes it easy for the ferromagnetic metal to realize a column structure and a polymer deposits between the columns. Since an insulating polymer deposits between the columns, an electric resistance increases in comparison with a simple substance of an original ferromagnetic metal. Thereby, an eddy current loss reduces, deterioration of permeability in a high frequency region is restrained, and a saturated flux density increases" (page 2, upper left column).

The structure disclosed by Takeshi does not correspond to a granular substance.

Applicant argues that Takeshi does not disclose granular ferromagnetic materials. However, applicant's specification is silent to using ferromagnetic granular materials. Additionally, the secondary reference discloses using ferromagnetic granular materials. One skilled in the art would recognize substituting a ferromagnetic material with a granular ferromagnetic material.

Although Table 1 of Takeshi shows coercive force of high permeability materials, it is very difficult to calculate the mean particle size of the ferromagnetic metal particles in Takeshi based on only coercive force. This is because a mean particle size of ferromagnetic metal particles depends on several factors such as an exchange stiffness constant and magneto-crystalline anisotropy, which are determined based on a type of production methods and kind of materials.

In Examples 1 and 2 of Takeshi, high permeability materials with a thickness of 5 microns were prepared by vacuum depositing Fe (ferromagnetic metal particles) and polymer. In order to realize the structure wherein the ferromagnetic metal particles have a column structure and the polymer deposits between the columns, the ferromagnetic metal particles must have a mean particle size of 1 microns or more in view of the energy balance of a general deposition process.

Assuming that the high permeability materials of Takeshi have a mean particle size of 5 to 15 nm like the present invention while the ferromagnetic metal particles have a column structure and the polymer deposits between the columns, the cross sectional structure of the ferromagnetic metal particles shall be extremely spindly.

Thus, even in a case when the high permeability material has a thickness of 1 micron (Takeshi's Examples have a thickness of 5 microns), the aspect ratio (major axis/minor axis) of the ferromagnetic metal particles shall be 100.

It seems impossible to realize a column structure having an aspect ratio of 100 in view of the energy balance of a general deposition process. Although no mean particle size of the ferromagnetic metal particles is mentioned in Takeshi, the ferromagnetic metal particles will probably have an aspect ratio of 1 if the deposition is conducted in a uniform energy field, leading to have a mean particle size of I micron or more.

Applicant argues that Takeshi does not have a particle size of 5 to 15nm as required by the claim. However, Fujimori discloses a ferromagnetic metal phase of 20 nm or less (Paragraph 0012).

Fujimori is not seen to remedy the defects of Takeshi and the Office does not rely upon the reference for such. Instead, Fujimori is cited for its relevance regarding ferromagnetic metal phases having a mean particle size of 20 nm or less, or 10 nm or less.

The magnetic thin film of Fujimori, consists of ferromagnetic metal phases and ferromagnetic insulating phases, whereas the granular substance of the present claims 1 and 17 essentially consists of ferromagnetic metal particles and a nonmagnetic insulating organic material. In other words, the ferromagnetic insulating phases of Fujimori does not correspond to the nonmagnetic insulating organic material of the present claims 1 and 17.

Claims 1 and 17, as amended, states that the volume ratio of the nonmagnetic insulating organic material in the granular substance is in the range of 5 to 50%. In connection with this feature, the specification recites the following:

"For obtaining the soft magnetic properties, it is important that the ferromagnetic metal particles 2 has a mean particle size of 50 nm or less, the spins of the ferromagnetic metal particles 2 are in random orientations, and the distance between the ferromagnetic metal particles 2 is a distance enabling exchange coupling therebetween." (page 10, second paragraph)

"For obtaining the soft magnetic properties, it is important that the distance between the ferromagnetic metal particles 2 is a distance enabling exchange coupling therebetween as described above. In the present invention, the distance between the ferromagnetic metal particles 2 can be adjusted by the volume ratio of the matrix 3. If the volume ratio of the matrix 3 exceeds 50%, the distance between the ferromagnetic metal particles 2 becomes so large that exchange coupling force between the ferromagnetic metal particles 2 is lost. Thus, in the present invention, the volume ratio of the matrix 3 formed of the nonmagnetic insulating organic material is 50% or less." (page 10, last paragraph) in order to obtain a nano-sized ferromagnetic metal, the magnetization in each of the ferromagnetic metal particles needs to be in random orientations. The orientations are affected by a particle size, magnetic anisotropy energy, grain boundary structure and so on.

Applicant argues that the volume ratio of the nonmagnetic insulating substance in the granular material is 5 to 50% and this is required for exchange coupling. However, JP ‘322 discloses a surface ratio of not larger than 15 percent (table 1. line 11 and 14). Given that the ferromagnetic particle size is similar (5 to 15nm) the volume ratio would necessarily be similar. The ratio is considered a result effective variable as

the volume ratio would be changed in determining the desired resistivity. As the volume ratio increases, the material resistivity will change. Absent unexpected results, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the volume ratio since it has been held that where general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In the present invention one would have been motivated to optimize the volume ratio of the insulating organic material in the granular material in the range of 5 to 40% in order to change the films resistivity.

The following figure schematically represents the random anisotropy model or very small and simple ferromagnetic metal particles. In contrast, the present granular substance comprises a nonmagnetic insulating organic material such as an organic polymer which exists between the ferromagnetic metal particles. The granular substance of the present invention is designed in order for the nonmagnetic insulating organic material to have a suitable thickness between the ferromagnetic metal particles, and lead to obtain a high resistivity while the exchange coupling between the ferromagnetic metal particles is enabled. In contrast, Fujimori fails to disclose and suggest how to set the volume ratio of the nonmagnetic insulating organic material.

Since the magnetic thin film of Fujimori is consists of ferromagnetic metal phases and ferromagnetic insulating phases, other magnetic moment interferes with the exchange coupling between the ferromagnetic metal particles. Thus, the mechanism of magnetism in Fujimori is different from that in the present granular substance in which the exchange coupling between the ferromagnetic metal particles is enabled.

The magnetic thin film of Fujimori may have the following magnetic anisotropy configuration, and thus the magnetic interaction in Fujimori must be very complicated. It is not clear if the magnetic anisotropy of the ferromagnetic metal particles of Fujimori can be in random orientations without being affected by the magnetic anisotropy of the ferromagnetic insulating phases.

Applicant argues the Fujimori interaction between the granular substance and the insulating substance would result in a complicated interaction. However, applicant is not claiming the interaction between the particles. Additionally, the magnetic particles in a polymeric matrix would be exchange coupled to one another. As the volume of

polymeric material increases the exchange interaction between particles would decrease.

As such, the combined teachings of the prior art fail to teach or suggest each element of the claimed invention. As such, the combination suggested by the Office cannot render the claimed invention obvious.

Accordingly, Takeshi in view of Fujimori is not obvious over present claims 1 and 17. Likewise, dependent claims 2-12, 19-20, 22, and 23-25 are also patentable over Takeshi in view of Fujimori for at least the same reasons as claims 1 and 17.

Claim 21 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshi, et al. in view of Fujimori, and further in view of Gay, et al. (U.S. Pat. No. 5,629,092). Applicant respectfully traverses this rejection.

Claim 21 depends from amended claim 17, and as such includes all the limitations thereof, and is therefore patentable over Takeshi in view of Fujimori for at least the same reasons discussed above with regard to claim 17. Gay is not seen to remedy the defects of Takeshi and Fujimori and the Office does not rely upon the references for such. Instead, Gay is cited for its relevance regarding soft ferromagnetic particles coated with Teflon in obtaining high lubricity (Col. 5, lines 1-45 & 62-67).

Applicant argues that the Gay reference does not teach the missing features in Takeshi in view of Fujimori. This argument is not found persuasive as coating a soft ferromagnetic particle with Teflon is known in the art as taught by Gay.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GARY D. HARRIS whose telephone number is (571)272-6508. The examiner can normally be reached on 8AM - 5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Ruthkosky can be reached on 571-272-1291. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Ruthkosky/
Supervisory Patent Examiner, Art Unit 1785

/G. D. H./Gary Harris
Examiner, Art Unit 1785